

## POPULATION DYNAMICS AND MILK CONTRIBUTION BY VARIOUS BOVINE SPECIES IN UTTARAKHAND

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India is the leading milk producer in the world. Dairy farming, one of the most important economic activities in the rural mountainous areas of Uttarakhand, is closely intertwined with farming systems. Thus, dairying has a high economic potential in the region. Therefore present study was conducted to know characteristic of bovine population pattern and their contribution to the status of milk production in different distinct of Uttarakhand. Data on the species-wise population and milk production of different districts were taken from the annual report 2008 of Uttarakhand livestock development board. The data were analyzed to obtain percentage and ranks of bovine population in the different districts of the state. It was observed that crossbred cattle population was highest (rank1) in U. S. Nagar about 23.54% while as indigenous cattle population was highest in Pauri about 17.76%. Among all the districts, Haridwar had highest (rank1) population of buffalo about 21.86% while as total bovine population was highest in Pauri about 16.34%. Also Pauri district has maximum population of indigenous cattle about 17.55% and about 5.40% buffalo population and 4.11% crossbred cattle population i.e. why this district has low contribution about 8.03% in total milk production of the state due to low production of local cattle. In 2000-01 contribution of cow's milk in total milk production was 34.08% and buffalo's contribution was 65.9%. But in 2007-08, the contribution of cow milk has increased by

4.28 %, while contribution of buffalo milk has decreased by 4.3%. Also per capita milk availability per day in 2002-03 has increased from 339g to 353g in 2007-08. In milk production Haridwar district contributes maximum of about 17.19% in the total milk production of the state. So it can be concluded that the Haridwar district has maximum milk production because it has maximum population of buffalo's and second highest cattle population.

**Keywords:** Bovine species, Population pattern, Contribution, Milk production, Uttarakhand

India is the leading milk producer in the world which is largely attributable to the promotion of intensive dairy production and organizational setup. Dairy farming is one of the most important economic activities in the rural mountainous areas. Rural communities fondly relish dairy products. Dairying again is the main purpose of animal husbandry in mountainous areas. Apart from ensuring nutrient supplies to the families owning dairy farms, dairying also offers promising employment opportunities and handsome economic returns. In Uttarakhand Mountains, dairying is especially a promising economic activity for smallholders who constitute the majority of farming communities in the region (Singh, V. 2002). The region has a high potential of dairying because of the following facts:

practically every household in the rural and semi-urban areas own livestock, a mixture of cows and buffaloes, most of the households own more than one cattle head, so milking is available throughout the year by rotation and small scale dairies and milk collection centers are coming up on their own throughout the region, competing at times with the state-owned dairy sector, sometimes complementing it by acting as its outreach nodes, and at times giving a service to areas that are neglected by the government network. Thus, dairying has a high economic potential in the region. Therefore present

study was conducted to know characteristic of bovine population pattern and their contribution to the status of milk production in different districts of Uttarakhand.

### MATERIAL AND METHODS

The present study was focused on 13 Hill districts of Uttarakhand, namely, Haridwar, Udham Singh Nagar, Nainital, Almora, Bageshwar, Pithoragarh, Champawat, Dehradun, Pauri, Rudraprayag, Tehri, Uttarkashi and Chamoli. The study area lies in the Indian Central Himalayas.

**Table 1.** District wise population and percentage of non-descriptive and crossbred cattle in Uttarakhand.

S. No.	DISTRICT	Cattle					
		Cross bred (%)	Cross bred rank	Indigenous cattle (%)	Indigenous cattle rank	Total cattle (%)	Total cattle rank
1	ALMORA	4.33	9	11.62	2	10.86	3
2	BAGESHWAR	0.58	13	6.10	8	5.53	10
3	NAINITAL	11.95	2	7.31	6	7.79	6
4	UDHAM SINGH NAGAR	23.54	1	3.58	13	5.66	8
5	PITHORAGARH	7.60	4	11.39	3	11.00	2
6	CHAMPAWAT	5.45	7	4.44	12	4.55	13
7	DEHRADUN	7.48	5	7.55	5	8.58	5
8	PAURI	4.11	10	17.76	1	16.34	1
9	TEHRI	1.00	11	6.16	7	5.62	9
10	UTTARKASHI	4.88	8	4.88	11	4.88	11
11	CHAMOLI	6.75	6	8.82	4	8.61	4
12	RUDRAPRAYAG	0.99	11	5.10	10	4.68	12
13	HARIDWAR	11.29	3	5.22	9	5.85	7

Dairy in the Hills is an integral part of the farming systems, which are largely distinguishable from those in the plains, especially in terms of their diversity, fragility, poor accessibility and marginality. Data on the species-wise population of bovine in different district were culled from internet and annual report 2008 of Uttarakhand livestock development board for studying their population and production pattern. The population data of each district were divided by the total bovine population of the state, so as to obtain percentage and ranks according to species wise in different districts.

### RESULTS AND DISCUSSION

#### Characteristics of Population in different district

It can be observed from the table 1 and table 2 that the population of crossbred cattle were highest in U. S. Nagar about 23.54% followed by Nainital (11.95%) and Haridwar (11.29%) while as indigenous cattle were highest in Pauri about 17.76% followed by Almora (11.62%) and Pithoragarh (11.39%).

Table 2. District wise population and percentage of buffalo and total bovine in Uttarakhand.

S. No.	DISTRICT	Buffalo		Total Bovine	
		Buffalo (%)	Buffalo rank	Total cattle and buffalo (%)	Total cattle and buffalo rank
1	ALMORA	8.93	5	10.17	3
2	BAGESHWAR	3.44	10	4.78	10
3	NAINITAL	10.02	3	8.59	6
4	UDHAM SINGH NAGAR	14.32	2	8.77	5
5	PITHORAGARH	7.07	6	9.58	4
6	CHAMPAWAT	3.06	12	4.01	13
7	DEHRADUN	5.83	7	7.59	7
8	PAURI	5.40	8	12.40	1
9	TEHRI	9.36	4	6.97	9
10	UTTARKASHI	3.15	11	4.25	11
11	CHAMOLI	4.49	9	7.13	8
12	RUDRAPRAYAG	3.03	13	4.08	12
13	HARIDWAR	21.86	1	11.60	2

Table 3 District wise milk production (in thousand metric tonne)

S. No	District	Milk Production (%)	Rank in milk production	Population rank		
				Crossbred cattle	Indigenous cattle	Buffalo
1.	Haridwar	17.19	1	3	9	1
2.	Udhamsingh Nagar	12.38	2	1	13	2
3.	Nainital	7.63	8	2	6	3
4.	Almora	9.10	3	9	2	5
5.	Bageshwar	4.02	10	13	8	10
6.	Pithoragarh	7.87	7	4	3	6
7.	Champawat	3.39	13	7	12	12
8.	Dehradun	8.18	5	5	5	7
9.	Pauri	8.03	6	10	1	8
10.	Rudraprayag	3.53	12	12	10	13
11.	Tehri	8.54	4	11	7	4
12.	Uttarkashi	4.00	11	13	11	11
13.	Chamoli	6.09	9	6	4	9

Among all 13 districts Haridwar had highest population of buffalo about 21.86% then U.S. Nagar (14.32%) and Nainital (10.02%) while as total bovine population were highest in Pauri about 16.34% then Pithoragarh (11.00%) and Almora (10.86%). Haridwar district had second highest population of bovine among which, it had maximum (rank1) population of buffalo's and 3<sup>rd</sup> highest crossbred cattle (rank3) population i.e. this district has maximum

contribution in total milk production. Pauri district had highest population of bovine about 12.40% followed by Haridwar (11.60%) and Almora (10.17%). Also this district has maximum population of indigenous cattle about 17.55% and about 5.40% buffalo population and 4.11% crossbred cattle population because of it, this district has low contribution about 8.03% in total milk production of the state. These all three district constitute about 34.17% of the total bovine population in the state. In the

Nainital district, the populations of cross bred female cows were significantly higher than that of female buffaloes (Sharma, *et al.*, 2007). The figures obtained are not in conformity with many other findings in the far off villages in the mountainous region (Tulachan, P M and Neupane, A. 1999; Singh, V. and Tulachan, P. M. 2002). The livestock composition in this study well corroborates with that in the Terai area of Uttarakhand where cattle population exceeds than that of buffaloes (Singh, V. 1999 and Singh *et al.*, 2001).

In Uttarakhand, the crossbred cattle population has increased heavily (121.4%) as compared to indigenous cattle population (1.8%) during the period between 1997 and 2003. There is an overall increase of 7.8% in total cattle population during this period. The buffalo population has also increased by 12.3%. The total livestock in the Uttarakhand state has increased from 4.586 million to 4.944 million between these two censuses showing an increase of 7.8% (Livestock census report, 2005). The most noticeable change over a period of about four decades is an overwhelming increase in the population of buffaloes which is at the cost of cattle (Tulachan *et al.*, 2000 ; Singh, V. and Tulachan, P. M. 2002).

### ***Trends in Milk Production***

In milk production, Haridwar district contributes maximum of about 17.19% in the total milk production of the state followed by U. S. Nagar (12.38%) and then Almora (9.10%). These three districts contribute about 38.67% of the total milk production in the state. In 2000-01 contribution of cow's milk in total milk production was 34.08% and buffalo's contribution was 65.9% but in 2007-08 contribution of cow milk (38.36%) has increased by 4.28 %, while contribution of buffalo milk (61.60%) has decreased by 4.3 %. With gradual emphasis on dairy sector, milk production in Uttarakhand hills has increased from 1026 thousand MT in 2000-01 to about 1221 thousand MT in 2007-08, recording an impressive rise of 16 percent over this period (Annual report of ULDB, 2008).

Milk production in Uttarakhand Hills has increased from 419 thousand MT in 1979-80 to about 715 thousand MT in 1999-2000, recording an impressive rise of 71% over this period (Tulachan, P M and Neupane, A. 1999). Average daily per capita availability of milk in six mid-altitude villages of Champawat district came out to be 698 ml (Bohra *et al.*, 2004). Studies from other mountainous areas, such as Himachal Pradesh in India (Singh, V. 1999) and Nepal (Tulachan, P M and Neupane, A. 1999) suggest almost the same trend as in the Uttarakhand Hills.

### **CONCLUSION**

Crossbred cattle were highest (rank1) in U. S. Nagar about 23.54% while as indigenous cattle was highest in Pauri about 17.76%. Among all 13 districts Haridwar had highest (rank1) population of buffalo about 21.86% while as total bovine population was highest in Pauri about 16.34%. Haridwar district has maximum population of buffalo's which means that maximum contribution of buffalo's milk in total milk production of this district but U. S. Nagar district has highest population of crossbred cattle among all the district, and also has second highest population of buffalo's which means that in this district both buffalo's and crossbred contributes to its milk production. It can be concluded that Haridwar district has maximum milk production because it has maximum buffalo population and second highest total bovine population.

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